REMARKS/ARGUMENTS

The Office Action was mailed in the present case on May 25, 2006, making a response due on or before August 25, 2006. Since this response is being submitted in a timely manner, no extension fee is due at this time. If any additional fee is due for the continued prosecution of this application, please charge the same to Applicant's Deposit Account No. 50-2555 (Whitaker, Chalk, Swindle & Sawyer, LLP).

In the Office Action of May 25, 2006, the Examiner rejected Applicant's Claim 21 under 35 U.S.C. §112 as being "indefinite" in that it was not clear whether the term "greater" referred to "about 2" or whether the term referred to the range "about 2 to 6." Applicant has amended Claim 21 to specify that the pipe body being welded has a finished outside diameter of "greater than about 6 inches." Applicant's Claim 22, which was not amended in this response, describes the pipe bodies of the invention as having finished outside diameters "greater than about 12 inches." The point of these numerical ranges is to distinguish Applicant's pipes used for oil and gas transport, production and slurry transport, from other types of pipe which may be of much smaller diameter and which may have much smaller wall thicknesses. Note, in this regard, paragraph [0030] of Applicant's Specification which describes a 0.375 inch thick strip as a starting material. Applicant's teachings relate to the field of manufacturing "heavy wall" pipes, as opposed to the myriad of prior art processes which may be manufacturing much thinner walled pipes. Independent Claim 10 has been amended to include the term "heavy wall" pipe. Obviously, the manufacturing techniques used in producing a welded 0.375 inch thick, 12 inch diameter oil field pipe would likely differ drastically from the techniques used in manufacturing much smaller pipe.

The Examiner also substantively rejected Applicant's Claims 10, 13-14, 16 and 21-28 under 35 U.S.C.§103(a) as being unpatentable over Toyooka (U.S. Patent Application Publication 2003/0057695 A1) in view of Hirasawa (U.S. Patent Application Publication 2003/0188813). The Examiner argues that Toyooka discloses a method of manufacturing a seam welded pipe formed from stainless steel (dual phase), wherein the carbon content is in the range of 0.003 to 0.15%, with the chromium content in the range of 10-18%, and with the molybdenum content up to 2.5 weight

%. The Examiner argues that, since these ranges overlap Applicant's claimed ranges, that a prima facie case of obviousness is made out. However, the Examiner admits that Toyooka does not specify the chemical balance of the stainless steel as determined by the Kaltenhauser Factor, which limitation is included in Applicant's remaining independent Claim 10.

The Examiner then combines the teaching of Hirasawa with that of Toyooka in an attempt to arrive at Applicant's claimed invention. Hirasawa is cited for the position that high frequency induction welding is an art recognized alternative seam welding process for stainless steel piping and could therefore be substituted for the welding processes used in Toyooka, or for Toyooka's lack of teaching of such a welding process.

Applicant has amended independent Claim 10 in view of the Examiner's remarks. Claims 16 and 26-28 have been canceled as being unnecessary to further define the invention. Dependent Claim 25 has been amended to correct a typographical error. Reconsideration of the remaining claims is requested in view of the remarks which follow.

There are a number of reasons why even the combination of the teaching of Toyooka with Hirasawa would not arrive at Applicant's presently claimed invention. First, with reference to Toyooka, the teaching of this patent allows up to 0.20% carbon versus Applicant's maximum of 0.08% carbon. Applicant has found that stainless steels having above 0.08% to 0.20 weight % carbon cannot be welded satisfactorily by the Electric Resistance Welding method included in Applicant's amended Claim 10.

The Examiner argues that, Toyooka may not specify the chemical balance of the stainless steel as determined by the Kaltenhauser Factor (Office Action page 4), "but Toyooka's compositions fall within Applicant's claimed ranges and therefore would be expected to have the same properties."However, Applicant's argument is that one skilled in the art would not know how to arrive at Applicant's claimed steel chemistry by reading the overly broad ranges taught in Toyooka. Going outside Applicant's ranges would result in an inoperable process, as far as Applicant's claimed invention. For example, Applicant never goes above 0.08 maximum weight % carbon

content in the steel chemistry because of the detrimental effect on the weld properties, i.e., hardness and ductility, which results. Increasing the carbon content above 0.08% causes a resulting higher HAZ hardness and resultant lower weld ductility. This action would endanger not passing the pipe crush test.

The following is a table for hardened 13% chromium stainless steel, which Applicant has compiled, showing the impact of carbon content on martensite hardness for Applicant's class of steel chemistries:

Carbon Content(%)	Rockwell C Hardness
0.03	28
0.07	38
0.15	48
0.25	52
0.38	58

As an example, it was established that 12% chromium ferrite/martensite stainless steel ERW tube and pipe passed the required crush test with the weld HAZ hardness in the Rockwell C hardness range of 28 to 34. This is with a carbon content range of 0.010 to 0.030%, which is below Applicant's claim limitation of "less than about 0.080% maximum content by weight carbon." It would be detrimental to use the higher ranges of carbon content allowed by the Toyooka teaching for dual phase or martensitic 12% chromium stainless steel pipe due to the weld ductility issue.

Further, the Toyooka reference allows a chrome content of up to 18% versus Applicant's specified range of up to a maximum of 14% chrome. Additionally, the steel chemistry of Toyooka does not always comply with Kaltenhauser formula while Applicant's claimed invention requires that the steel chemistry always comply with Kaltenhauser formula. Applicant has found that steel chemistries outside of the Kaltenhauser formula can not be satisfactorily welded by Electric Resistance Welding method.

The Toyooka reference uses stainless steel tubes which were previously welded by multiple welding methods. The Toyooka reference reduces up to 20% of the diameter of a prior manufactured stainless steel tube that was already acceptably welded by multiple welded methods. In fact, Applicant's method could have been used to produce the previously welded tube which is the subject of the further processing described by Toyooka. The reference then uses certain designated elevated temperatures to obtain ductility in the steel pipe. This is to be contrasted with Applicant's method of making stainless steel pipe by cold forming a plate and using the Electric Resistance Welding method to an as-rolled diameter of pipe.

The Toyooka manufacturing technique apparently has applicability for an automobile structural member with formability versus Applicant's technique used for producing larger diameter, thicker wall pipe for oil and gas transportation, production and slurry transportation. Obviously, Toyooka is not a pipe manufacturer, but rather is a reducer of stainless steel pipe with a steel chemistry for the pipe necessary to produce the desired physical characteristics after reducing a pipe that has been heated to a controlled level of heat.

Toyooka's stainless steel pipe outside diameter is not important to the ability to be welded by the Electric Resistance Welding method. In fact, Toyooka's 2.1 mm wall thickness has been historically and successfully been welded by the Electric Resistance Welding method by multiple manufacturers for many years. However, heavier wall pipe has not been successfully welded using this technique in the past. Applicant's method can be successfully used with pipe walls ranging, for example, from 3.175 mm to 12.700 mm. However, the process can only be successfully used with a starting stainless steel material where the chemistry of the steel complies with Kaltenhauser formula and has less than 0.80% carbon and not less than 10% and not more than 14% chrome by content, as specified by Applicant's claims.

Likewise, the combination of the Hirasawa teaching with that of Toyooka would fail to teach or suggest to one how to arrive at Applicant's presently claimed invention. The Hirasawa reference teaches a method for making a stainless steel sheet for welded structural components. These would be, for example, structural components for vehicles such as railway vehicles, automobiles, and

buses, as well as civil engineering structural components. Obviously, Hirasawa is not a pipe manufacturer, but rather a manufacturer of stainless steel sheet that has the ability to be made into multiple products when welded by multiple welding methods.

Hirasawa's described method for making stainless steel sheet could be used in Applicant's claimed method of making pipe only if the chemistry of the steel is formulated to fall within the Kaltenhauser formula and where the chemistry includes a maximum of 0.80weight % carbon and 10 to 14weight % chrome. Conversely, Hirasawa's sheet could be made into pipe by any welding method including Applicant's presently claimed method or by utilizing the pipe from any method including Applicant's method. However, note that the specific welding method taught in Hirasawa at paragraph (0076) was MIG (Metal Inert Gas) butt welding (Wire). Applicant's electric resistance welding method can only be used on pipe and can not be used on flat structural surfaces addressed by Hirasawa's patent.

To summarize, dual phase stainless steel has been known for many years with the initial patents having now expired. At least one hundred companies make ASTM 409 and 410 stainless steel and both contain the chemistry parts required to make dual phase stainless steel. However, the 409/410 materials do not incorporate the controlled mix of chemistry parts to comply with the Kaltenhauser formula required to successfully electric resistance weld heavy wall pipe.

Dual phase stainless steel chemistry falls between 409 SS and 410 SS chemistries. Applicant's claimed invention is directed toward a method to economically make a heavy wall stainless steel pipe by the electric resistance welding method that has been in use for many years from a family of stainless steel which has been around for many years. However, Applicant's method is to roll cold form SS plate, and to combine or match the specifically enumerated cold forming steps with a particular type of electric resistance welding, to thereby weld Kaltenhauser formulated stainless steel to produce a heavy wall stainless steel pipe. Applicant's specifically enumerated method steps had never before been developed or tried in a industrial setting, particularly in the field of heavy wall pipe used inoil and gas transport, production and slurry transport.

Accordingly Claims 10, 13-14 and 21-25 are thought to be allowable over the art of record and an early notification of the same would be appreciated.

Respectfully submitted,

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